

REMARKS

Claims 1-8, all the claims pending in the application, stand rejected. Claims 1, 4, 5 and 6 are amended.

Claim Objections

Claims 4-8 are objected to under 37 C.F.R. § 1.75(c) as being in improper form. The Examiner asserts that these claims have not yet been treated on the merits. Applicant has amended claims 4, 5 and 6 in order to remedy this deficiency. The claims, all of which are dependent from claims that Applicant submits are allowable, also should be allowable.

Claim Rejections - 35 U.S.C. § 102

Claims 1, 3 and 4-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Nakagawa et al (5,494,721). This rejection is traversed for at least the following reasons.

Claim 1 has been amended to expressly state that the predetermined reference value is “determined depending upon a required flatness required to the glass substrate.” This amendment is based on the description at line 9, page 15 of the present application and the text at lines 11-12 of page 15 that states “Depending upon the required flatness, the reference value for controlling the flatness in the flatness control step (P-3) is determined.”

Further, claim 4 has been amended to add the description “MRF (MagnetoRheological Finishing),” which is based on the description at page 12, lines 19-26:

“As a local machining method used in the flatness control step (P-3), not only the ion beam machining and the plasma etching mentioned above but also various other methods, such as MRF (MagnetoRheological Finishing) and CMP (Chemical-Mechanical Polishing) may be used.

In the MRF, an object to be machined (glass substrate) is locally polished by bringing abrasive grains contained in a magnetic fluid into contact with the object at a high speed and controlling a holding time of a contacted portion between the abrasive grains and the object.”

Nakagawa et al

Nakagawa et al discloses a method for fabricating a substrate for a magnetic disc which comprises glass.

By contrast, according to the amended claim 1, there is provided a method of producing a glass substrate for a mask blank. As would be understood by one skilled in the art, the magnetic disc comprising glass as disclosed in Nakagawa et al is significantly different from the glass substrate for a mask blank, as expressly set forth in amended claim 1, in many respects, including technical field, manufacturing processes, structural requirements and performance goals.

In this regard, Nakagawa et al disclose “a magnetic disc substrate suitable for making the magnetic disc which causes substantially no sticking to a magnetic head (column 1, lines 12-15)”. Nakagawa et al also disclose that “for avoiding the sticking of a magnetic head to a thin film magnetic recording disc, a substrate for the thin film magnetic recording disc has been required to have property rough surface rather than a mirror surface (column 1, lines 20-24)”, that “if the particle size is less than 100 angstroms, fine projections formed on the surface of substrate are small to avoid the problem of sticking of magnetic head (column 8, lines 45-47)”, and that “if it is more than 3.0 micrometers, the projections on the surface are too large which may inhibit the flying of a magnetic head (column 8, lines 47-49)”.

Thus, Nakagawa et al discloses that the projections of an appropriate particle size are intentionally or purposefully formed on the surface of the magnetic disc substrate in order to avoid the sticking of a magnetic head to the magnetic disc.

On the contrary, the present invention achieves high flatness of the surface of the glass substrate by the flatness control step of amended claim 1. Nakagawa et al is not at all concerned with achieving a greater flatness of the surface of the glass substrate. Instead, Nakagawa et al is directed to intentional or purposeful formation of the projections on the surface of the magnetic disc substrate in order to avoid the sticking of a magnetic head to the magnetic disc.

That is, Nakagawa et al does not disclose “a predetermined reference value determined depending upon a required flatness required to the glass substrate” for a mask blank in the flatness control step of amended claim 1. In other words, Nakagawa et al does not disclose that the flatness of the surface of the glass substrate is controlled to a value not greater than a predetermined reference value determined depending upon a required flatness required to the glass substrate.

More specifically, Nakagawa et al does not disclose or even recognize the need for “a flatness control step of controlling a flatness of the surface of the glass substrate to a value not greater than a predetermined reference value determined depending upon a required flatness required to the glass substrate by specifying the degree of convexity of a convex portion present on the surface of the glass substrate with reference to a result of measurement obtained in the profile measuring step and by executing local machining upon the convex portion under a machining condition depending upon the degree of convexity”.

In the present application, however, at page 11, lines 9-12 of the specification, the flatness is defined as a difference between the maximum value and the minimum value of a measured plane of the surface of the glass substrate with respect to a virtual absolute plane (focal plane) calculated from the measured plane by a least square method. Nakagawa et al only refers to the particle size of the projections (column 8, lines 45-49) intentionally or purposefully formed on the surface of substrate.

Finally, the convex portion present on the surface of the glass substrate in amended claim 1 is different from the projections of Nakagawa et al. The convex/concave profile of a surface of the glass substrate for a mask blank in amended claim 1 is equivalent in meaning to a convex curve/concave curve profile of a surface of the glass substrate for a mask blank.

Claim Rejections - 35 U.S.C. § 103

Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakagawa et al (5,494,721) in view of Carr et al (5,761,790). This rejection is traversed for at least the following reasons.

Carr et al (US 5,761,790) does not remedy the deficiencies of Nakagawa et al, as identified with respect to parent claim 1. In particular, Carr et al does not discloses “a flatness control step of controlling a flatness of the surface of the glass substrate to a value not greater than a predetermined reference value determined depending upon a required flatness required to the glass substrate by specifying the degree of convexity of a convex portion present on the surface of the glass substrate with reference to a result of measurement obtained in the profile measuring step and by executing local machining upon the convex portion under a machining condition depending upon the degree of convexity.” Moreover, Carr et al does not provide any

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teaching or suggestion as to how the disclosure of Nakagawa et al, as they relate to a magnetic disc, may be applied to a substrate for a glass blank.

Claims 7-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakagawa et al (5,494,721) in view of Ohnuma (6,924,068). This rejection is traversed for at least the following reasons.

Ohnuma also does not remedy the deficiencies of Nakagawa et al, as identified with respect to parent claim 1. In particular, Ohnuma does not disclose “a flatness control step of controlling a flatness of the surface of the glass substrate to a value not greater than a predetermined reference value determined depending upon a required flatness required to the glass substrate by specifying the degree of convexity of a convex portion present on the surface of the glass substrate with reference to a result of measurement obtained in the profile measuring step and by executing local machining upon the convex portion under a machining condition depending upon the degree of convexity” Moreover, Ohnuma does not provide any teaching or suggestion as to how the disclosure of Nakagawa et al, as they relate to a magnetic disc, may be applied to a substrate for a glass blank.

Conclusions

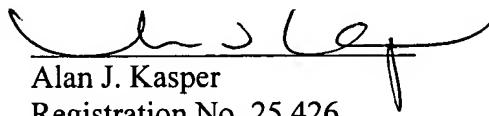
Applicant has demonstrated how claim 1, as now amended, is clearly patentable over the prior art, taken alone or in combination. Furthermore, Applicant believes that remaining claims 2-8 are also patentable because they depend from the patentable claim 1.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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